Nanomite

Syringe Pump

User's Manual

Nanomite Syringe Pump   *MA1 70-2217*

HARVARD
A P P A R A T U S

WEEE/RoHS Compliance Statement

EU Directives WEEE and RoHS

To Our Valued Customers:

We are committed to being a good corporate citizen. As part of that commitment, we strive to maintain an environmentally conscious manufacturing operation. The European Union (EU) has enacted two Directives, the first on product recycling (Waste Electrical and Electronic Equipment, WEEE) and the second limiting the use of certain substances (Restriction on the use of Hazardous Substances, RoHS). Over time, these Directives will be implemented in the national laws of each EU Member State.

Once the final national regulations have been put into place, recycling will be offered for our products which are within the scope of the WEEE Directive. Products falling under the scope of the WEEE Directive available for sale after August 13, 2005 will be identified with a "wheelie bin" symbol.

Two Categories of products covered by the WEEE Directive are currently exempt from the RoHS Directive – Category 8, medical devices (with the exception of implanted or infected products) and Category 9, monitoring and control instruments. Most of our products fall into either Category 8 or 9 and are currently exempt from the RoHS Directive. We will continue to monitor the application of the RoHS Directive to its products and will comply with any changes as they apply.
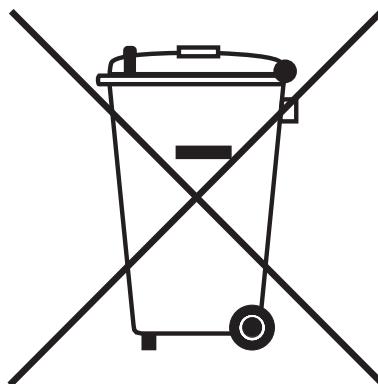
- **Do Not Dispose Product with Municipal Waste**
  - **Special Collection/Disposal Required**

Table of Contents

Harvard Apparatus Nanomite Syringe Pump

SUBJECT	PAGE NO.

General Information

Serial Number

All inquires concerning our product should refer to the serial number of the unit. Serial numbers are located on the rear of the chassis.

Calibration

All syringe pumps are designed and manufactured to meet their performance specifications at all rated voltages and frequencies. A calibration certificate is available upon request. Contact customer service for details and pricing.

Warranty

Harvard Apparatus warranties this instrument for a period of two years from date of purchase. At its option, Harvard Apparatus will repair or replace the unit if it is found to be defective as to workmanship or material.

This warranty does not extend to damage resulting from misuse, neglect or abuse, normal wear and tear, or accident.

This warranty extends only to the original customer purchaser.

IN NO EVENT SHALL HARVARD APPARATUS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR USE, OR OF ANY OTHER NATURE.** Some states do not allow this limitation on an implied warranty, so the above limitation may not apply to you.

If a defect arises within the one-year warranty period, promptly contact your local distributor or ***Harvard Apparatus, Inc. 84 October Hill Road Holliston, Massachusetts 01746-1388*** using our toll free number 1-800-272-2775 (valid only in the U.S., outside U.S. call 508-893-8999). Goods will not be accepted for return unless an RMA (returned materials authorization) number has been issued by our customer service department. The customer is responsible for shipping charges. Please allow a reasonable period of time for completion of repairs, replacement and return. If the unit is replaced, the replacement unit is covered only for the remainder of the original warranty period dating from the purchase of the original device.

This warranty gives you specific rights, and you may also have other rights which vary from state to state.

Repair Facilities and Parts

Harvard Apparatus stocks replacement and repair parts. When ordering, please describe parts as completely as possible, preferably using our part numbers. If practical, enclose a sample or drawing. We offer a complete reconditioning service.

CAUTION

This pump is not registered with the FDA and is not for clinical use on human or veterinary patients. It is intended for research use only.

> **C A U T I O N**
> **FOR RESEARCH USE ONLY**
> **NOT FOR CLINICAL**
> **USE ON PATIENTS**

General Safety Summary

Harvard Apparatus Nanomite Syringe Pump

Please read the following safety precautions to ensure proper use of your syringe pump. To avoid potential hazards and product damage, use this product only as instructed in this manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

To Prevent Hazard or Injury

Use Proper Power Supply

The pump is supplied with an approved power supply and line cord. To maintain the safety integrity of the device, use only one of the following power supplies:

Ault Inc.

Model: PW118

Output: 12 Vdc, 1.5 A,

Input: 100-250 Vac, 50-60 Hz, .5A

Cui Inc.

Model: SA06N12-V

Ouptut: 12 Vdc, 2.0 A

Input: 100-240 Vac, 50-60 Hz, .8A

Globtek Inc

Model.: GT-4201D-12

Output: 12 Vdc, 1.66 A

Input: 100-240 Vac, 50-60 Hz, 0.6A

Use Proper Line Cord

Use only the line cord shipped with the product and make sure line cord is certified for country of use.

Ground the Product

This product is grounded through the return path of the DC power supply. To avoid electric shock, use only approved power supply and line cord with the product.

Make Proper Connections

Make sure all connections are made properly and securely.

Observe all Terminal Ratings

Review the operating manual to learn the ratings on all connections.

General Safety Summary

Harvard Apparatus Nanomite Syringe Pump

Avoid Exposed Circuitry

Do not touch any electronic circuitry inside of the product.

Do Not Operate with Suspected Failures

If damage is suspected on or to the product do not operate the product. Contact qualified service personnel to perform inspection.

Observe all Warning Labels on Product

Read all labels on product to ensure proper usage.

⚠️ *CAUTION*
   Refer to Manual

Functional Ground
Terminal

Enviromental Conditions

- Indoor use only
- Temperature 4˚C to 40˚C (40˚F to 104˚F)
- Humidity 20% to 80% RH
- Well Ventilated Room
- Altitude up to 2000 m
- Mains Voltage Fluctuation not to Exceed +/- 10% of Nominal
- Transient Overvoltage, Category II
- Pump is Rated Pollution Degree 2 in Accordance with IEC 664

Introduction

Theory of Operation

The Nanomite is designed as a low cost, single infusion pump. The Nanomite is standard with serial communication (dual RS232), reversing switch, and foot switch. The Nanomite consists of a control unit, an injection unit, and a 6 ft. cable.

The pump can hold syringes of any make from 0.5 µl to 1000 µl. The internal diameter of the syringes is entered via the keypad and the internal microprocessor drives a precision stepper motor to produce accurate fluid flow.

Nonvolatile memory stores the last syringe diameter and flow rate along with other configuration data.

The "Power Failure Mode" can be set to either turn the pump off in the event of power failure or to resume pumping when power resumes.

Features

Bright Display and Easy-To-Use Interface

A two-line 16 character vacuum fluorescent display along with six membrane keys make this a most attractive but powerful, easy-to-use syringe pump. Only two entries required to start pumping; syringe Inside Diameter (mm) and pumping flow rates. The Flow rate can be changed while the Pump is running.

Two Modes of Operation, Constant Flow Rate & Volume Dispense

The Nanomite will operate continuously in RATE mode or accurately dispense a specific amount of fluid in VOLUME mode.

Smooth Flow

Enhanced micro-stepping pump profiles deliver very smooth and consistent flow, that is virtually pulse free.

Nonvolatile Memory

The pump remembers its last syringe size, flow rate used and configuration settings.

Power Fail Mode

In a power failure the Pump can either RESUME or STOP pumping when power is returned.

CE Mark Approved

The Nanomite meets all relevant European EMC and Safety requirements for laboratory equipment. Voltage selector switch and fuse for 110/220V.

Loading The Syringe

Raise the spring loaded syringe clamp and rotate away from the syringe barrel.
Using the fast forward/fast reverse feature position the pusher block so that the
syringe plunger and syringe barrel will fit into the syringe holder and pusher block.

Place the syringe barrel in the V of the syringe holder, making sure that the flange of
the syringe barrel is positioned between the two upright posts, and lower the syringe
plunger knob into the pusher block. Rotate and release the syringe clamp to hold the
syringe in place.

Syringe Clamp

Pusher Block

Removable Mounting Rod

Syringe Clamp

Pusher Block
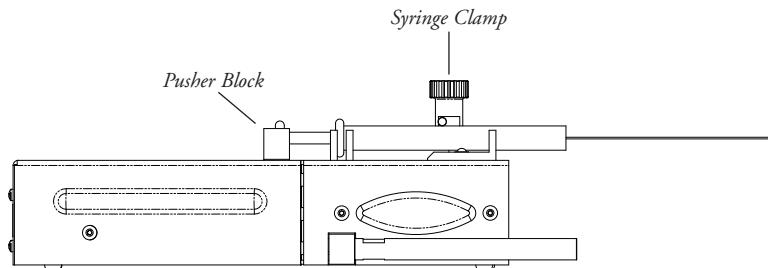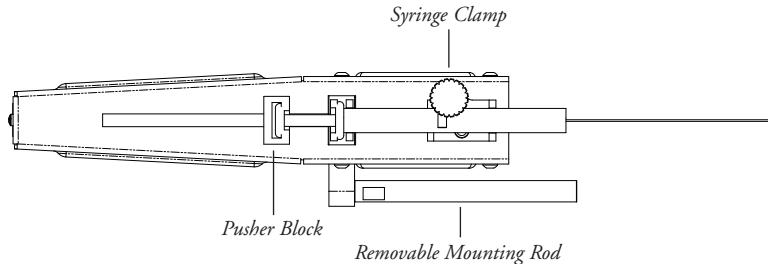
Installation

Initial Setup

1. Read the manual to become familiar with all features and functions of the Nanomite.

2. Connect the external DC Power Supply and line cord to the pump and main supply.

3. Connect the 6' cable to control box and remote mechanism. Observe orientation and polarity of the connector.

4. Turn on main power switch located on the rear panel. The display will now illuminate indicating that the power connections are correct.

Location Requirements for the Syringe Pump

- A sturdy, level, clean and dry surface

- Minimum of one inch (2.5 cm) clearance around the pump

- Appropriate environmental conditions

- A well ventilated room

Loading the Syringe

Using the Fast Forward Fast Reverse feature, position the Pusher Block to accept the loaded syringe. Pull the retaining knob up and set the syringe into the holding clamps for the barrell flange and plunger. Release the knob and insure that the pin rests on top of the syringe barrel.

Getting Started

1. Turn Pump 'ON'

Turn on power using the switch on rear of the pump, the display will light, and indicate Nanomite and Software version 9.0.

2. Function Keys and Run Indicator

Refer to the colored keypad at the front of the pump to identify the following functions starting from the right.

RUN/STOP – This turns the pump motor on and off.

ENTER – This key enters the data that is on the display into the memory of the pump. Also used to query the flow rate.

DIAM – Used to enter or query the syringe diameter.

SET – This key is used to select which digit of the display is to be changed, to move the decimal point and to move between modes. Each time the set key is pressed the underline cursor below the digit or character on the display moves one step to the right. It is used in conjunction with the ascending and descending keys. When it the display shows the desired the correct value the set key will advance right to the next digit.

▲▼ – The ascending and descending keys are used to change the numbers on the display. ▲ Up key makes numbers increase, ▼ Down Key makes numbers decrease. When the underline cursor is placed below the decimal point, the ▲▼ keys shift the decimal one place up or down.

Run Indicator – When the pump is running, the highly visible, blue LED near syringe mounting blocks will illuminate. This LED will be on when in the pumping mode, and will flash when in the volume dispensing mode.

Operation: Getting Started

3. Enter Syringe Size

Enter the inside diameter (ID) of the syringe you wish to use. Units are in millimeters (mm). Max setting is 6.0 mm.

If you do not know your syringe diameter, refer to appendix B for nominal inside diameters of most popular syringes. For the greatest accuracy or if your syringe is not listed in appendix B, measure the inside diameter with a vernier caliper or other precision measuring tool. Record this value for future use.

Press SET followed by the DIAM key. The previously used diameter will appear on the display. The underline cursor will appear under the left-most digit or decimal point. The ▲ and ▼ keys are used to scroll to the desired number and the SET key moves the underline cursor one place to the right. Once the desired diameter is displayed, press the ENTER key to place this value into memory.

4. Enter Flow Rate Range

Choose your flow rate units; either microliters or nanoliters, per minute or per hour.

From the initial RATE VOL CONFIG menu, using the ▼ or ▲ key, move the underline cursor under the CONFIG mode menu prompt. Press the SET key to enter the CONFIG mode. Press the SET key again to move the underline cursor to the flow rate choices. Choose your flow rate units while in the SET:UNITS mode by pressing the ▼ or ▲ keys to scroll the four flow rate choices; nl/min, µl/min, nl/hr, µl/hr. Once the desired flow rate units are displayed, press the ENTER key to return to the main SET:CONFIG mode. Press SET or ENTER again to put your desired flow rate units into memory and return to the RATE VOL CONFIG menu. These units will be the same for infuse and withdraw.

NOTE: Small syringes must be used in order to access the nL/hr range.

5. Enter Flow Rate

From the initial RATE VOL CONFIG menu, press the SET key to enter the SET:RATE mode. Each time you change the syringe diameter, the previously used flow rate is erased. If the syringe diameter is unchanged, the previously used flow rate will appear on the display. The underline cursor will appear under the left-most digit or decimal point. The ▼ and ▲ keys are used to scroll to the desired number and the SET key moves the underline cursor one place to the right. Once the desired rate is displayed, press the ENTER key to place this value into memory. This value will be the same for infuse and withdraw.

6. Press RUN

Press the RUN/STOP key to start pump and begin pumping. The Run Indicator (Blue LED located in mechanism box near syringe barrel) will light when the pump is on and pumping.

7. Check Syringe Often

The Nanomite will shut itself off via the volume mode. It will not shut off in pump mode. Although this presents no hazard to the user or the pump, it is prudent to check the syringe from time to time.

Operation: Advanced Features

1.   Volume Mode

The Nanomite can be set to dispense a precise volume and then stop. To activate the volume dispense mode a target volume must be set.

To set a target volume, at the RATE VOL CONFIG display, move the underline cursor, using the ▼ or ▲ key, to VOL. Press the SET key to enter the VOL set mode. Use the s or t key and the SET key to display a target volume from 00.01 to 99.99. Volume units are either nl (nanoliter) or μl (microliters). Target volume units are established in the CONFIG SET:UNITS mode; example: if your pumping units are μl/ min or μl/ hr, then the volume dispense units will be μl's. Press the ENTER key to select the desired target volume. Exit the VOL mode by pressing the ENTER key.

Once you press the RUN key, the pump will run until the target volume is delivered. The display will show the actual volume dispensed along with the target volume. Press the RUN key each time you want to repeat the volume dispense. If you press the STOP key during a volume dispense, you can restart the pump at the place you stopped by pressing the RUN key again.

To exit the volume dispense mode, set the target volume to 00.00 or turn off and on the pump via the main power switch. NOTE: In the event of a power failure, the actual dispensed volume and the target volume are not retained in memory. This means that while in volume dispense mode, if a power failure occurred, the pump would not resume volume dispense pumping even if the POWER ON mode was set to run. This mode will function for both infuse and withdraw. Blue LED mounted in mechanism will flash as it dispenses to target. Beeper will sound three times at the end of volume dispense once target is reached.

2.   Power Failure

In the event of a momentary or prolonged power failure, the Nanomite can be set to either:

a) Resume pumping when power is returned, with "POWER FAIL" on the display.

b) Not start pumping when power is returned, with "RATE VOL CONFIG SELECT MODE" on the display.

To set the power fail mode, at the RATE VOL CONFIG display, move the underline cursor, using the ▼ or ▲ key, to CONFIG. Press the SET key to enter the CONFIG mode options. Use the ▼ or ▲ key to scroll the CONFIG options until you reach the SET:POWER ON: display. Press the SET key again moving the underline cursor to the right. Use the ▲ or ▼ key to scroll the POWER:ON choices; 'stop' or 'run'. Press the ENTER key to select either mode. Exit the CONFIG mode by pressing the ENTER key again and save the POWER:ON setting in memory. This feature is only for pump mode.

3. Display Intensity

For varying light conditions, four levels of intensity can be set on the vacuum fluorescent display

To set the desired display intensity, at the RATE VOL CONFIG display, move the underline cursor, using the ▼ or ▲ key, to CONFIG. Press the SET key to enter the CONFIG mode options. Use the ▼ or ▲ key to scroll the CONFIG options until you reach the SET:INTENSITY:. Press the SET key again moving the underline cursor to the right. Use the ▼ or ▲ key to scroll the SET : INTENSITY choices; "1", "2", "3", "4" (4 is highest intensity, 1 is the lowest intensity). Press the ENTER key to select the desired display intensity. Exit the CONFIG mode by pressing the ENTER key again and save the INTENSITY setting in memory.

4. Changing Rates

If the pump is running at an existing rate it will continue to do so until a new rate is entered. Except for volume mode, the flow rate can be changed while the pump is running. As soon as the ENTER key is pressed the pump will change to the new flow rate. To change rates from the keypad, while in volume mode, the pump must be stopped first.

5. Infuse/Withdraw Switch Operation

For customer convenience, a two position rocker switch is included in the Nanomite for changing from infuse to withdraw on the fly. When the pump is infusing, and the switch is toggled, the pump will now be in the withdraw mode. Switch the toggle again, it puts it back into infuse mode. The physical position of the switch does not matter. The pump always powers up in infuse mode.

6. Maintenance

Keep the pump clean and dry. Avoid liquid spills that may find their way into the electronics.

A small container of grease is provided for periodic lubrication of the lead screw and guide rods. It is important to keep these guide rods clean and lubricated.

To clean the exterior surfaces, use a lint-free cloth to remove loose dust. Use care to avoid scratching the display window. For more efficient cleaning, use a soft cloth dampened with water or an aqueous solution of 75% isopropyl alcohol.

If the pump does not work properly, contact Harvard Apparatus for appropriate instructions.

Operation: Advanced Features

7. Remote Communication

The Nanomite RS232 option is equipped at the factory for remote serial communications. The baud rate and address are set in the CONFIG mode options.

a. Pump Address

To set the pump address, at the RATE VOL CONFIG display, move the underline cursor, using the ▼ or ▲ key, to CONFIG. Press the SET key to enter the CONFIG mode options. Use the ▼ or ▲ key to scroll the CONFIG options until you reach the SET:ADDRESS. Press the SET key again moving the underline cursor to the right. Use the ▼ or ▲ key to scroll the two digit number fields. Use the ▼ or ▲ key and the SET key to display a unique pump address from 00 to 99. Press the ENTER key to select the desired pump address. Exit the CONFIG mode by pressing the ENTER key again and save the ADDRESS setting in memory.

b. Baud Rate

To set the pump Baud Rate, at the RATE VOL CONFIG display, move the underline cursor, using the ▼ or ▲ key, to CONFIG. Press the SET key to enter the CONFIG mode options. Use the ▼ or ▲ key to scroll the CONFIG options until you reach the SET:BAUD. Press the SET key again moving the underline cursor to the right. Use the ▼ or ▲ key to scroll the SET:BAUD choices; '300', '1200', '2400' or '9600'. Press the ENTER key to select the desired baud rate. Exit the CONFIG mode by pressing the ENTER key again and save the BAUD setting in memory.

8. Press RUN Or Foot Switch

Press the RUN/STOP key or press the foot switch to start pump and begin pumping. The Run Indicator (Blue LED) will light when the pump is on and pumping.

9. FAST FORWARD/FAST REVERSE

Press simultaneously the run and the ▲ key, or the run and ▼ key to actuate the fast forward or fast reverse mode respectively. The pump travels at its maximum rate while both keys are pressed simultaneously.

Appendix A

Nanomite Specifications

Type	Microprocessor single syringe
Syringe/Size for Nanomite with Single Syringe Holder:	Glass; From 0.5 µl to 1000 µl
Flow Rate Range:	
Minimum	3.3 nl/hr with 0.5 µl syringe
Maximum	1901 µl/min with a gastight 1 ml syringe
Flow Rate Accuracy	± 0.5%
Calibration	Automatic, enter syringe size up to 6.00 mm Inside Diameter
Display	2 line, 16 character vacuum, fluorescent display and blue run LED
Nonvolatile Memory	Stores diameter, rate and configuration settings
Maximum Force	11 to 12 lbs
Drive Motor	1.8° step angle
Step Rate:	
Minimum	1 pulse in 27.6 sec
Maximum	200 steps/sec
Pusher Advance/Step	0.8 µm pusher advance per motor step
Pusher Travel Rate:	
Minimum	7.0 µm/min
Maximum	114 mm/min
Dynamic Range	1 to 16,384
Leakage to Ground	Typically < 150 µA
Ground Resistance	Typically < 0.05 Ω
Input Power	12 VDC 1.5 Amps
Input Power Connection	2.5 mm ID x 5.5 mm OD male plug
Power Supply	100-250 VAC, 50/60 Hz, 18 Watts Universal Power Supply, Use Only a Harvard Apparatus Approved Power Supply and Line Cord
Control Unit	
Size, H x W x D	8.9 x 22.9 x 11.4 cm (3-1/2 x 9 x 4-1/2 in)
Weight	1.7 kg (3.80 lb)
Injector Unit	
Size, H x W x D	1.0 x 18.5 x 5.0 cm (2-1/2 x 7-1/4 x 2 in)
Weight	0.36 kg (0.80 lb)

Harvard Apparatus Nanomite Syringe Pump

―――――――――――

SGE
Scientific Glass
Engineering

Size, µl	Diameter, mm
25	0.73
50	1.03
100	1.46
250	2.30
500	3.26

―――――――――――

Hamilton Microliter
Series Gastight - 700,
1700, 1000 Series

Size, µl	Diameter, mm
0.5	0.103
1	0.1457
2	0.206
5	0.3257
10	0.460
25	0.729
50	1.031
100	1.46
250	2.3
500	3.26
1000	4.61

Appendix C: Flow Rates

nominal syringe size (µl)	inside diameter (mm)	nl/hr		nl/min		µl/hr		µl/min	
		min	max	min	max	min	max	min	max
0.5	0.10	3.300	9999	0.0600	894.8	0.0032	53.00	0.0001	0.800
1	0.15	7.374	9999	0.1230	2013	0.0074	120.8	0.0003	2.013
2	0.21	14.46	9999	0.2409	3946	0.0144	236.7	0.0004	3.946
5	0.33	35.69	9999	0.5948	9744	0.0357	584.6	0.0006	9.744
10	0.46	69.35	9999	1.156	9999	0.0694	1136	0.0012	18.93
25	0.73	174.7	9999	2.911	9999	0.1747	2861	0.0030	47.68
50	1.03	347.7	9999	5.800	9999	0.3477	5696	0.0058	94.93
100	1.46	698.6	9999	11.65	9999	0.6986	9999	0.0120	190.7
250	2.30	1734	9999	28.90	9999	1.734	9999	0.0290	473.3
500	3.26	3483	9999	58.05	9999	3.483	9999	0.0590	951.0
1000	4.61	6965	9999	116.1	9999	6.965	9999	0.1161	1901

This table reflects the minimum and maximum values programmable for the specified syringe diameters.

Appendix D: Serial Communication

Commands, Queries and Responses

After each transmission to the pump terminating with a CR character (ASCII 13), the pump enters remote mode and responds with the three character sequence:

CR	LF	*prompt*

The prompt character indicates the status of the pump as follows:

prompt	meaning	ASCII code
:	When stopped	(ASCII 58 decimal)
>	When running forward	(ASCII 62 decimal)
<	Reverse	

Nanomite does not include stall detection.

Serial commands and their meanings:

Commands:

KEY	Return to keyboard control. Exit remote mode
RUN	Start infuse (forward direction)
STP	Stop motor
CLV	Clears volume accumulator to zero
CLT	Clears target volume to zero, dispense disabled
REV	Start (Reverse Direction)

Commands with numbers:

MMD	number	Set syringe diameter, units are mm. Rate is set to zero after MMD command.
ULM	number	Set flow rate and range, units are microliters per minute
NLM	number	Set flow rate and range, units are nanoliters per minute
ULH	number	Set flow rate and range, units are microliters per hour
NLH	number	Set flow rate and range, units are nanoliters per hour
TGT	number	Set target infusion volume, units depending on flow rate range

Numbers can be between 0 and 9999.

Leading zeros and trailing decimal point are optional. Any number of digits to the right of the decimal point may be transmitted. The number will be rounded.

Appendix D: Serial Communication

Queries

DIA Returns diameter value units in mm

RAT Returns rate value set in current range units

VOL Returns current accumulated infused volume, units in ml or μl depending on range

VER Returns model and version number of firmware

TAR Returns target volume, units in nl or μl depending on range

value format: nnnn.nnn

The returned value is an 8 character string with leading zeros converted to SP characters (ACSII 32 decimal). The fifth character is a decimal point (ASCII 46 decimal)

Queries With String Response:

RNG Returns range message (character string either: NL/H, NL/M, UL/H, UL/M)

Error responses:

CR LF ? CR LF prompt   Unrecognized command

CR LF OOR CR LF prompt   Entered value in out of range

Pump Chain

Pump Port 1 (in)   - Computer control side

Pump Port 2 (out)   - Connection for remainder of pump chain

Baud Rate   - 300, 1200, 2400 or 9600

Word Size   - 8

Parity   - none

Stop Bits   - 2

Appendix E: Dual RS-232

TXD

RXD

GND

GND

GND

GND

TXD

RXD

IN   **OUT**

*Host
Computer
Connection*

*Chain
Connection to
Additional Pump(s)*
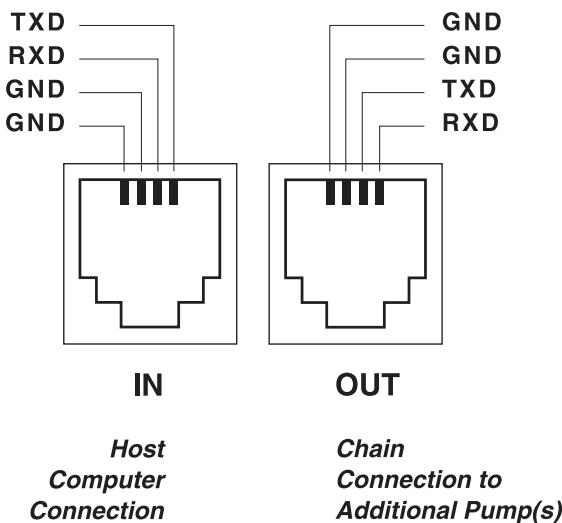
Daisy-Chain Connector & Cables

| Part No.	Description
MA1-70-2022	RS232 Serial Cable, 6 ft long, 9 pin d-sub on one end, and RJ11 on the other end
MA1-72-2478	Daisy Chain Cable, 6 ft
MA1-55-7760	Daisy Chain Cable, 2 ft
MA1-72-8340	USB to Serial Adapter

Appendix F: PC Connection
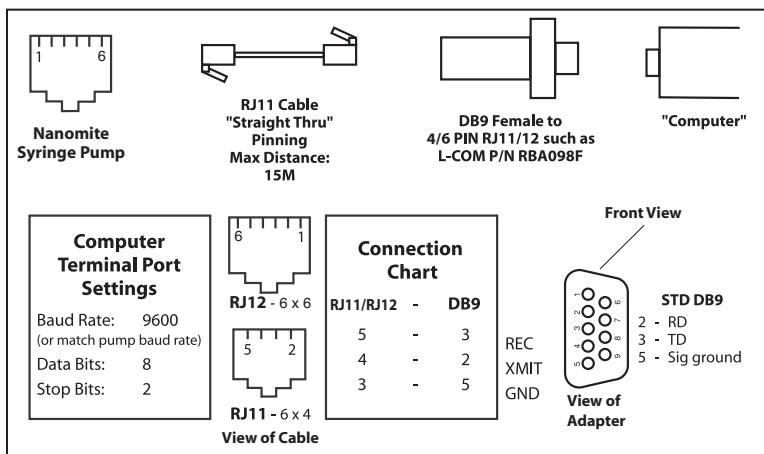
Figure 10. Nanomite to PC Connection

Declaration of Conformity

Application of
  Council Directive(s):   *73/23/EEC, 89/336/EEC*

Standard(s) to which
  conformity is declared: *EN61010-1 (1993) + A2 (1995),*
        EN 61326: 1997 + A1: 1998
        Class A Emissions, Class B Immunity

Manufacturer's Name: *Harvard Apparatus, Inc.*

Manufacturer's Address: *84 October Hill Road*
        Holliston, Massachusetts 01746
        U.S.A.

Type of Equipment: *Syringe Pump*

Model No.:   *Nanomite*

I, the undersigned, hereby declare that the equipment specified above
conforms to the above Directive(s) and Standard(s).

Place: *United States of America*

Date: *April 1, 2005*

CE

HARVARD
APPARATUS

_____
(Signature)

Robert D. Bohne
(Full Name)

VP Engineering / Operations
(Position)